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U. S. Dept. Agr.
Extension Service
Washington 25, D. C.

States Carrying on Research on
Problems in Food and Nutrition

1950-51

Workers on Projects: - Arizona

1. Amino acid content of Southwestern Foods: Broccoli, cauliflower, carrots, sweet corn, black-eyed peas, spinach, sweet potatoes, Irish potatoes, pinto beans, peahuts, Mexican Jack cheese, pink beans, garbanzo beans, pinon nuts, pecans, etc.
2. Vitamin content of Indian foods: Mesquite beans, Indian corn, saguaro fruits, cholla buds, prickly pear, jerky, pinola and tortillas.
3. Relation of amino acid metabolism to rheumatoid arthritis.
4. Interrelationships of Food Factors: a) Zanthophyll and carotene in chicks; b) factors affecting liver storage of Vitamin A in rats and chicks; c) Nutritional value of alfalfa.
5. Cooperative research in poultry nutrition problems peculiar to Arizona climate.

Colorado

Workers on Projects: Gestur Johnson, R. E. Carlson, H. A. Durham, Duane Johnson, Marjorie Mayer, and W. E. Pyke.

1. Purnell 90, Properties and Processing of Colorado Fruits and Vegetables. (Sub-project): A study of the nature and control of enzymatic browning.

A report of progress of this work was made at the Decennial Conference of the Institute of Food Technologists in Chicago on May 22 by Gestur Johnson. This report indicated the separation and characterization of the polyphenolic substances in peaches and Montmorency cherries. Work on the characterization of these substances in apples is in progress.

2. (Same workers). Purnell 90, Properties and Processing of Colorado Fruits and Vegetables. (Sub-project): New frozen fresh fruit products.

The products developed in the past three years include frozen fresh fruit, pie-mixes, frozen fresh fruit sundae-toppings, and frozen fresh apple pulp or sauce. Pilot runs on the pie mixes have been made in Colorado and the Northwest. Public acceptance studies of these mixes have been very favorable.

Frozen fresh fruit sundae-toppings have been introduced recently in Colorado and in the Dairy Queen stores in Washington and parts of Oregon. The Washington State Apple Commission has been so impressed with the possibilities of the frozen fresh apple pulp that it is offering assistance to any interested food processors who may wish to make trial runs to prepare this pulp for use in apple sherbert.

3. (Same workers and A. R. Patton, Patricia Chism, Cyrus O. Guss, John R. Popish without Duane Johnson and Marjorie Mayer). (Sub-project): A study of the nature and control of non-enzymatic browning in foods and feed.

A method for control of non-enzymatic browning in the preparation of potato chips has been developed (U. S. Patent No. 2,448,162). At the request of the editor of Nutrition Reviews, Dr. Patton recently reviewed the status of the work at this station (A. R. Patton, Present Status of Heat-Processing Damage to Protein Foods. Nutrition Reviews 8, 193, 1950).

In addition to the basic work in progress we are engaged in a contract project with the Food and Container Institute for Armed Forces in a study to adapt our findings to the control of non-enzymatic browning in dehydrated foods.

Workers on Project: Dr. Ferne Bowman, Dr. Elizabeth Dyar, Miss Miriam E. Hummel, Mrs. Mariana W. Kulas, and research assistants.

Problem 4. Baking of Flour Mixtures at High Altitudes.

Brief statement of present status and results to date: This project has included a study of the baking of cakes at altitudes of 5,000 and 7,500 and 10,000 feet. A special constructed altitude chamber has been used for the study.

Numerous publications have appeared since 1930. The most recent report of work is Colorado Experiment Station Bull. No. 40 "Mile-High Cakes." A manuscript for a bulletin on all-purpose flour mixes for different altitudes is in the process of being printed.

Workers on Project: Dr. Elizabeth Dyar, Mrs. Mariana W. Kulas, team of nurses, physicians, chemists, etc.

Problem 5. Nutritional Status of Selected Population Groups in Colorado.

Adolescent children and older residents of Colorado in Lake County and in El Paso county (10,000 and 6,000 feet altitude respectively) were given thorough physical and nutritional examinations. A week's record of food intake and dietary history were secured. Blood was examined for various vitamins and other constituents. The results of the field study conducted in 1949-50 are now being analyzed. This project is part of the Cooperative Nutritional Project of the Western Region.

Workers on Project: Dr. Elizabeth Dyar, Miss Miriam E. Hummel, workers in chemistry and horticulture sections.

Problem 6. Properties and Processing of Colorado Fruits and Vegetables.

Statement of present status and results to date: The project has included studies of the vitamin content of Colorado products prepared in different ways. Recent work by the Home Economics Section has included a study of ascorbic acid retention of vegetables cooked at different altitudes in pressure saucepans.

Workers on Project: I. L. Madsen, Aggie scientists, Dr. Paul R. Frey, Dr. H. S. Wilgus.

Search for unknown factor in alfalfa contributing to ability of animals and poultry to utilize carotene as a source of vitamin A.

Based on equivalent intake of carotene and vitamin A, chickens fed alfalfa supplements, fresh or dehydrated, produce eggs of higher vitamin A content. The eggs contained twice as much vitamin A as eggs from chickens fed almost pure carotene supplement in cottonseed oil and three times as much as birds fed vitamin A in fish liver oil. While vitamin A was superior in building liver reserve of that vitamin, carotene from alfalfa was superior in the transfer of vitamin A to the egg.

Carotene and vitamin A supplements are much used in poultry feeds, Dr. Frey points out. If the "utilization" factor can be determined and isolated, maybe it can be used to "supercharge" other feeds and make the carotene more easily available.

Ivan L. Madsen, poultry husbandry graduate student, has chemically separated an alfalfa meal into two parts. Feeding trials show one part retains the unknown factor while the other does not. He is further dividing the one fraction down to a point where it may be possible to isolate and identify the unknown factor.

Idaho

Workers on Project: Homo economics nutritional research personnel of the Experiment Stations of the Western Region.

Nutritional Status of Population Groups in Selected Areas of the West - Idaho Phase

The work on the Idaho phase of this study begins in Boise, January 3, 1951. Special emphasis will be placed on dental health.

Workers on Project: Ella Woods, Kathleen Porter and cooperating dentists.

Dental Health in College Freshmen at the University of Idaho.

Dental examinations have been given to 307 freshmen students at the University of Idaho who were born and reared in Idaho. These records have been summarized in terms of decayed, missing, and filled (DMF) teeth and surfaces according to area. There is a three-fold difference in dental caries between the best and the worst areas. Results from this study have been useful in determining areas for the field work in the Idaho phase of the Western Region's Cooperative Nutritional Status Study.

Workers on Project: (same)

Biological Availability of Nutrients in Foods in Common Dietary Uses in Idaho.

Three series of balance studies with 15 human subjects (194 subject days) have been completed on the availability of thiamine from baked potatoes and roast leg of lamb. In the first two studies, availability of the thiamine from the test foods fed together was compared with the availability of pure thiamine, as determined by measuring the thiamine excreted in the urine which was collected as one hour fasting samples and 23 hour collections. Under the conditions of these studies, the 12 subjects utilized the thiamine from lamb and potatoes about 75% as well as the pure thiamine. In the third study, approximately one-third of the daily intake of thiamine was furnished on successive 2-day periods by potatoes, lamb, lamb and potatoes together, and pure thiamine, with 2 days of basal diet separating the test periods. The test food replaced foods of similar thiamine contents in the basal diet so that the intake remained uniform. With all seven subjects there was better availability of thiamine, as judged by 24-hour urinary excretion, when the potatoes were eaten with the lamb than when the potatoes alone furnished the same amount of thiamine. These subjects apparently utilized the thiamine from lamb alone, and from lamb and potatoes together at least as well as the pure vitamin.

Montana

Workers: Groups in selected areas of Montana.

H.E. 32, The Nutritional Status and Dietary Needs of Population.

No results yet.

New Mexico

Workers: Edith M. Lantz, Helen W. Gough, Mae Martha Johnson, and Department of Home Economics Research.

The Nutritive Value of Spanish-American Foods.

Food common in the dietaries of Spanish-American people of New Mexico have been analyzed for moisture, ash, protein (NX6.25), calcium, phosphorus, ascorbic acid, thiamine, riboflavin, niacin, and in some cases, carotene.

Foods included are: Wild greens, "native" corn and products prepared from it, such as masa, tortillas, enchiladas, tamales; chick peas, chicos, panoche, sauces and "made" dishes of various kinds. Pinto beans and chile, two staple foods of the Spanish-American dietary have been analyzed in other projects.

Workers: Edith M. Lantz and Helen W. Gough, Department of Home Economics Research.

I. Pinto and pinto-type beans.

1) The relation of strain and locality to the cooking quality and chemical composition of pinto-type beans.

2) The relation of strain, locality and the season to the amino acid content of pinto beans.

3) The effect of planting date on cooking quality and chemical composition of pinto-type beans.

These three projects are parts of the same problem. The first which has just been completed, showed that variety, locality and season had significant effects on the cooking quality and chemical composition (moisture, ash, calcium, phosphorus, thiamine, riboflavin, niacin and protein) of different varieties of dried beans. Locality has more influence than either of the other two factors. The second project adds amino acids to the nutrients studied. This is just being started. The third is also a new project.

Workers: Edith M. Lantz and the Department of Home Economics Research.

Suitability of Different Varieties of New Mexico Peaches for Preservation by Freezing.

This project was renewed this summer. Some work was done several years ago and on the basis of the results about 35 varieties of peaches rated on retention of color, flavor, and texture after freezer storage. Destruction of the peach crop by spring frosts interrupted the work which was resumed this summer.

Workers: Edith M. Lantz, Viola Fisher, Department of Home Economics Research.
New Mexico Department of Public Health.

Nutritional Status of Population Groups in New Mexico.

This project was set up as a state project supporting the Western Region Cooperative Nutritional Status Project. Miss Fisher, who has had considerable experience in community nutrition programs, accompanies pediatricians of the state public health service and interviews mothers, attending prenatal and well-child clinics, concerning family food habits. These data are studied in relation to the findings of the physical examinations of the children. Dietary findings are expressed as percent of children in a certain locality receiving adequate amounts of the 7 basic food groups. The physical condition of the children is expressed as percent falling into poor, fair, good, very good, excellent nutritional condition. Particular attention is given to dental caries and gingivitis.

To date about 3500 mothers have been interviewed. These are mostly mothers of pre-school children. Some work has been done in schools. 116 teen-age girls attending "Girls' State" were examined and dietary histories taken. 87 of the 4-H Club members attending State Encampment were examined and dietary histories taken.

Diets are most often lacking in milk, whole cereals and sources of Vitamin C. Children of only one county were found to be getting enough milk. Consumption of candy and soft drinks is very high.

Workers: Department of Dairy Husbandry.

Sandiness in Ice Cream.

Workers: (same)

Flavor Defects in Goats' Milk.

Workers: (same)

Carotene and Vitamin A in Cows' and Goats' Milk.

Utah

Workers: Ethelyn B. Wilcox and D. A. Greenwood (1950-1953).

Nutritional Status of Normal and Rheumatic Fever Children; Their Parents and Grandparents.

1. To investigate the nutritional status of a group of children with rheumatic fever and a group of comparable normal children to determine relationships between diet and physical condition, dental health, and constituents of the blood in these groups.
2. To investigate the nutritional status of the parents and grandparents, if possible, of these children.

This is the contributing project of the Utah Station for the Regional Study on Nutritional Status of Population Groups (W-4). The research will be conducted by the Departments of Foods and Nutrition and Chemistry with the cooperation of the Utah State Department of Health, the Utah Medical and Dental Associations, and the University of Utah Medical School.

The nutritional records and medical and dental examinations to be made on each individual are as follows:

1. A 7-day dietary record.
2. A diet history.
3. Medical examination and medical history.
4. Dental examination of children.
5. X-ray of hand and heel (to determine the degree of calcification).
6. Blood analyses as follows: Hemoglobin, hemocrit and sedimentation, white blood count, blood smears, ascorbic acid micro method of Lowry and Bessey, vitamin A and carotene - micro method of Lowry and Bessey, riboflavin - micro method of Lowry and Bessey, cholesterol, serum iron and copper.
7. Albumen and glucose in urine.
8. Protein fractions in blood on part of the samples.

Personnel engaged in collecting the dietary records, making medical and dental examinations, and also chemical analyses will be as follows: A medical technician, four chemists, a dishwasher, two nutritionists, a secretary, a clinic nurse and two dentists and doctors who would examine subjects two half-days a week.

It is anticipated that the Mobile Laboratory will be in Utah during the period of July 1 to December 31, 1950, after which it will be moved into Idaho. During the second half of the year, while field data is being collected in Idaho, samples will be sent to the Campus Research Laboratory in Utah for chemical analyses. The data collected in Utah will be tabulated, summarized, and prepared for publication.

Workers: J. A. Bennett, D. A. Greenwood, Lorin E. Harris, and Ethelwyn B. Wilcox.

Meat Quality and Dressing Percentage as Influenced by Feed Sugar to Livestock Prior to Slaughter. (July 1950 to June 1954).

1. To determine the effect of feeding sucrose and syrups to farm animals prior to slaughter on dressing percentage and on color, texture, and flavor of cuts of meats obtained from them.
2. To determine the effect of feeding diets containing molasses and sucrose to farm animals on the sugar content of muscles and the pH, color, texture and flavor of the carcasses (this is the phase the Home Economics Department will work on).
3. To determine the influence of feeding molasses and sucrose to animals on the keeping quality of cured and frozen commercial cuts of meat.

This project will be conducted by the Chemistry, Animal Husbandry, and Foods and Nutrition Departments of the Utah Agricultural Experiment Station in cooperation with the Utah-Idaho Sugar Company and a Meat Packing Company.

Workers: E. B. Wilcox.

Purnell 257. The Effect of Various Factors, Including Freezing and Cooking Procedures, on the Nutritive Value of Lamb.

The quality and thiamine, riboflavin and niacin content of selected tissues of grass fat and fed lambs of second cross Rambouillet and native ewes, second cross Columbia and native ewes and first cross Targhee by native ewes is being studied. The Targhee grass fat lambs scored highest for tenderness in both the chops and legs. The chops scored lower than did the grass fat lambs of R₁ and C₁ of the fall of 1948 while the legs scored approximately the same.

In 1948 study the R₁ grass-fat lambs scored slightly better than the C₁ lambs in tenderness, flavor of lean of the chops and lower in flavor of lean of the legs and for juiciness. In the fed lambs the C₁ lambs scored slightly higher for most items with the legs being more tender and the chops being less tender than for R₁ lambs.

The muscles of the grass-fat lambs of both breeds contained more thiamine than those of the fed lambs. Shoulders of the grass-fat lambs also contained more riboflavin, but the chops and legs did not. Chops contained more thiamine than either legs or shoulders in all cases while the legs had the highest riboflavin values.

Workers: E. B. Wilcox and D. A. Greenwood. Report of the Utah State Board of Agriculture, 1949, 18 (continued) of 1949-50, 234. The Effect of Various Factors, Including Cooking, Freezing and Canning Procedures on the Quality and Vitamin Content of Utah Grown Fruits and Vegetables.

Peas: The carotene content of Perfection Peas which had been raised on soil receiving different fertilizer treatments increased with an increase in nitrogen content of the fertilizer. This substantiates our findings in 1947.

Celery: The ascorbic acid values for the outside stalks of seven varieties or strains of celery varied from 6.8 to 10.3 mg. per 100 gm. Values for inside stalks were slightly lower. The leaves had 3 to 4 times that amount. The carotene content of outside stalks was .107 to .126 mg. per 100 gm. which is about one-third the amount in green peas. The inside leaves contained more than twice as much carotene as green peas while the outside leaves contained about 15 times as much.

Workers: E. B. Wilcox and D. A. Greenwood.

State 299 (Reg. W-4): Nutritional Status of Population Groups in Selected Areas of Utah.

In 1948 the teeth of 794 USAC freshmen and 125 BAC freshmen were examined. Of this group 425 USAC and 110 BAC freshmen were born and raised in Utah.

In this latter group the 18 year old USAC men and women averaged 13 and 14 DMF teeth (decayed, missing, filled), exclusive of the third molars, respectively, while the BAC 18 year old men and women had 12 and 14 DMF teeth. Averages for all ages were similar. In the 18 year old Idaho group the men had 10 and the women 11 DMF teeth. In 1949 a group of 507 USAC freshmen were examined for their dental condition. The 18 year olds averaged 12 and 14.7 DMF teeth for the native men and women of Utah, and 10 and 11.6 for the native men and women of Idaho.

No area of the state as represented by these freshmen showed a low incidence of dental decay. No definite relationships were shown between place of residence, that is, urban or rural, source of water supply, condition of the gums or mottling of the teeth and the number of DMF teeth.

In February 1950 the teeth of the Brigham Young University freshmen were examined. The 18 year olds are 12 and 13 DMF for the native men and women of Utah, and 9.6 and 10.7 for the native men and women of Idaho.

Washington

Workers on project: Adams and Ross

1. Chemical Nature of the Softening of Maraschino Cherries.

This study was undertaken to determine cause of soft maraschino cherries. Effects of calcium bisulfite concentration, sugars, proteins, temperature and other factors are being studied such as fertilizers used on orchard soils.

Workers on project: Harrington

2. Consumer Acceptance for Washington Farm Products in the State of Washington

To ascertain the attitude of consumers in the State of Washington toward Washington farm products; to measure changes in those attitudes and preferences over a period of time.

Questionnaire covering consumer preferences and buying practices with respect to Washington State Dairy Product is completed and Seattle survey has been made.

During the past year the Public Opinion Laboratory and Division of Agricultural Economics prepared one poll on a trial basis, the poll including questions in regard to dairy and poultry products. Some of the information has been summarized and is ready for publication. A part of the information has been analyzed for use in a Master's Thesis to be completed in the fall. That trial poll attracted considerable interest and the technique seems to be of considerable value in testing this area of consumers' attitudes.

Present plans include two or three polls to be conducted this year that will investigate the attitudes and buying habits on other Washington products. It is also hoped that some time in the future another poll in the area of dairy and poultry products may be conducted in which changed attitudes may be investigated.

Workers on the project: Harrington, Baum.

3. Economic Study of the Seattle Milk Market.

A production economics study of the Seattle milk shed. A sample of approximately 200 milk producers will be chosen at random from a sample design stratified two ways: 1) By size of milk production per farm, and 2) by the degree of seasonality of milk production. In this manner, we will get representative samples and be able to study dairy farms having different herd sizes and dairy farms that produce milk following different seasonal patterns. A study of Milk Procurement, Receiving Station Operations, and Shipment of Milk to the Market. It is the purpose of this phase of the study to determine the adequacy and the relative efficiency of the present operational scheme.

A Study of City Milk Plant Operations.

A Consumption Economics Study for Milk and Milk Products in the Seattle Milk Marketing Area.

A Study of Milk Pricing.

Workers on projects: Murray and Armbruster.

4. Effect of Heat Processing on the Protein of Field Peas.

The biological value, the amino nitrogen and reducing sugars of the raw and canned field peas has been determined. The effect of supplementing peas with methionine and lysine has also been tried. So has the methionine in raw and canned peas.

Workers on projects: Stadelman, Jensen, Dockstader, McLaren.

5. Egg Quality Loss from Producer to Consumer.

Determined quality loss of eggs on the farm prior to marketing.

Determined quality of eggs in retail stores.

Determined methods of handling eggs by consumer.

Determined consumer preferences for shell eggs.

Plans: To determine quality loss in eggs at the various stages of marketing not covered in the work to date.

To conduct controlled laboratory studies best storage and handling methods for eggs.

Workers on projects: Ashworth and Hibbs.

6. Factors Affecting the Ease of Reconstitution of Whole Milk Powder.

Over 100 samples of whole milk powder were prepared on our pilot spray drying plant. Many different treatments have been studied. These include addition of traces of sodium phosphate, sodium citrate, calcium chloride, and certain emulsifiers. We have also tried treatment with ion exchange columns. These powders are sealed in cans. Part of the cans are stored at 45°F. and the remainder at 85°F.

Plans: To study the ease of reconstitution as measured by several different tests at intervals throughout the storage period at 85° and 45°F.

Workers on projects: Esselbaugh, Windhusen, Wilson, Morrison,

7. Family Nutrition and Home Management Study.

A study of nutritional and home management problems of families has been conducted for a year's period at New York University, the University of Nebraska, and Washington State College, under the McCall Cooperation. A careful study of nutritional status of 10 families (all age groups) in the Pullman area of Washington State has been made. Detailed medical and dental studies, including nutritional deficiency and blood analyses (for vitamin A, C, and Carotene) on X-rays for bone density, have been made. Individual home management problems have been studied and changes suggested for greater efficiency in work and more time for leisure. Final examinations are now under way. Results of study will be published in both scientific and popular publications.

Workers on projects: Hard, Ross, Clafson, Bartlett.

8. Freezing Preservation of Washington-Grown Vegetables.

Work is underway on the comparison of cold water, air, and mist cooling of vegetables scalded by steam and by hot water. The effect of these methods after 6 and 9 months frozen storage will be determined with regard to ascorbic acid content, soluble solids peroxidase activity and palatability. Vegetables studied are spinach, peas and snapbeans.

Workers on projects: Hard, Stumbo, Ross.

9. Home Processing of Washington Soft Fruits.

The results of chemical tests and taste panels showed:

The cold pack-boiling water bath method, hot pack, and open kettle methods for home canning soft fruits was studied. Use of pints and quarts, wide and regular mouth jars were compared. The effect of ascorbic and citric acid on color and flavor of frozen fruits. Fruits studied were sweet cherries, apricots, peaches, pears, plums, prunes and berries. Use of syrups, other than cane sugar syrups, in both canning and freezing has little advantage over cane sugar syrups.

Plans: Further studies on processing time for the cold pack method including bacteriological studies on lethal temperatures and time for bacteria most likely present on soft fruit.

Workers on projects: Esselbaugh, Hard, Murray.

10. The Interrelationships of the Various Nutrients as They Affect the Dietary Needs of Human Subjects.

Effect of low calories on protein, calcium, phosphorus and sulphur retention has been studied in 4 overweight young women. Information is awaiting publication.

Plans: Study of Biological Value of Protein in Washington Peas for Human is currently being investigated.

Workers on projects: Harrington.

11. Marketing of Peaches (regional project)

To determine more efficient systems and practices for marketing peaches in western states. The more specific objectives are: To determine the volume and types of quality outlets for peaches produced by areas; geography of the markets for fresh and processed peaches; prices received quality and grade in the various markets; costs of services including wholesaling, jobbing, and retailing; and net return to growers; to study the present organization, functions, and practices of agencies handling peaches and to determine the needed changes to increase the efficiency in marketing this crop.

To determine the economic factors, and influences which may have direct bearing on the production and marketing of peaches in the western states.

To determine the effect that different ways of handling fresh peaches have on the quality of product and on the economic efficiency of marketing. This would include a comparison of such things as :

- a) Different types and sizes of containers.
- b) Orchard and central packing.
- c) Different types of grading machinery and packing methods.
- d) Harvesting of different stages of maturity.
- e) Shipments by rail, truck and air.

To study the outlet, in detail, for fruit through processing:

Preliminary check on grading and packing was done.

Studies were made of field heat in several types of containers

Studies of 450 consumer preferences

Studies of peach shipments, distribution and selling.

Plans: Cooperation of BAE to assist on costs and margins.

Determine the consumer demand for peaches of varying maturities.

Carry out quality studies.

Study potential markets for peach production on newly irrigated land (Washington).

Workers on projects: Walkup.

12. Marketing Poultry and Poultry Products.

An economic study of marketing agencies and functions from the producer to the retailer in-so-far as they affect the marketing of poultry meat.

Data from questionnaires concerning the consumer acceptance of frozen turkey quarters marketed experimentally in Seattle, Washington, has been tabulated and analyzed.

Plans: Complete the work started under this project. Begin a study which will be made to determine the market structure including the agencies, functions, and practices involved in moving poultry from the producer to the retail stores; and to determine the efficiency and the adequacy of the functions and agencies involved.

Workers on projects: Esselbaugh, Hard, Jacobson.

13. Nutritional Status of Selected Population Group in Washington.

This is a cooperative project for the Western Region in which both University and State College are participating. Study started in the fall of 1950 to continue through 1952. Emphasis will be placed upon possible relationship between dental health and nutrition. Freshmen students on W.S.C. campus were examined by dental X-rays for decayed, missing and filled teeth. It is hoped these data can be used to define areas of high and low incidence of tooth decay within the state.

Workers on projects: Harrington, Pauls.

14. Production-Consumption Balance of Dairy Products in Washington.

To continue the records of production and in-and-out shipments of fluid milk and other dairy products for the 7-state area consisting of Arizona, California, Idaho, Nevada, Oregon, Utah, and Washington.

To estimate probable future trends in the production and utilization of these products in the area, as a basis for determining future relationships in their supply and demand, and resulting price structure relative to the national dairy market.

Production data for dairy products have been assembled from BAE reports for the 7 Western States. Carlot passing reports of butter and cheese of the Market News Service have been assembled and by personal survey in shipments of dairy products by Railway Express, baggage, motor freight. At present, assembling data on shipments out of the region is underway in order to complete the balanced picture for the 7-state region. Preliminary report now being prepared.

Workers on projects: Hard, Branthoover, Olafson, Bartlett.

15. Results of Home-Canning Studies in the Counties.

At the end of six months storage period, the fruits processed by 16 homemakers in 8 counties were examined for spoilage, non-sealers, vacuum in jars and quality, (i.e.) flavor, texture and color. A total of 384 jars of fruits (cherries, apricots, peaches and pears), have been examined to date.

Plans: It is strongly indicated that more work is needed in intermediate processing times.

Workers on projects: McLaren, Corbett, Sieburth.

16. A Study of the Physical, Chemical and Nutritional Properties of Whole Wheat (Unifine) Flour.

A bulletin is available. Work is being continued by Dr. McLaren and others on nutritional and rancidity studies of the whole wheat flour.

Workers on projects: Elkington, Parrish.

Supply, Demand and Prices of Washington Farm Products.

To study the fluctuation in the farm price of various Washington farm products and to analyze the factors that may be related to these fluctuations.

Washington apple prices are determined almost wholly by: 1) The level of U. S. consumer income and expenditures, 2) the supply and quality of the apple crop, 3) the supply and prices of other consumer goods, especially food products, and 4) exports and imports of apples.

Wyoming

Workers on project: E. J. Thiessen and student assistants.

(Dr. G. H. Starr and the Agronomy Dept. raised vegetables)

1. Dehydration and Dehydrofreezing of Snap Beans, Peas and Cauliflower.

Freezer space is often insufficient to care for the vegetable crop. Dehydro-freezing, in which a part of the water is eliminated, enables the homemaker to store about double the amount of vegetables in the locker or home freezer as would be possible by freezing by usual methods. Only certain vegetables are adapted to this method of preservation. Critical phases of the process are the amount of dessication vegetables will tolerate. The best blanching times and temperatures for dehydration of vegetables will vary with the type processed.

Workers on project: E. J. Thiessen and student assistants.

2. High Altitude Cooking.

The lower air pressure at high altitude affects the cooking of many foods. Favorite cake, doughnut and rich cooky recipes fail, home canned low-acid vegetables frequently will not keep when processed in an ordinary water bath or in a steam pressure cooker if low altitude pressure and time tables are used. Vegetables require a longer period of cooking to become tender. The cook who uses a thermometer to determine the finish temperatures for candies, icings, and jellies soon becomes aware that an entirely new set of temperatures must be used. All of these problems either have been or are being investigated in the Home Economics Research Laboratory at the University of Wyoming; bulletins issued by the Division of Research, Home Economics, Univ. of Wyoming, may be referred to for the high altitude baking formulas, high altitude temperatures, etc.